

Atty. Docket No. 420228

REMARKS/ARGUMENTS

The amendments and remarks hereto attend to all outstanding issues in the pending office action of 7 October 2005. Claims 1, 3-8, 10-12, 14, 16-19, 21 and 23-29 remain pending in this application. Claims 26 and 29 are currently amended without adding new matter.

In the Claims

Claims 26 and 29 are amended to change the words "to select image properties" to "to achieve selected image properties" to correct a typographical error in each of the claims as filed and to provide proper antecedent support. The amendments to claims 26 and 29 are supported by claims 26 and 29, respectively, as filed.

No new matter is added to the application through any of the claim amendments.

Response to Office Action

The following paragraphs follow the order of the paragraphs in the Office Action mailed 17 April 2006 in this application.

1. - 2. Claim Rejections – 35 USC §103

Claims 18, 19 and 23-29 stand rejected as being unpatentable over U.S. Published Patent Application No. 2003/0142877 ("George") in view of U.S. Patent No. 6,714,361 ("Mikš"). (Note, the inventor's name appears to be "Mikš," the Office Action appears to reiterate a "word" found on the front page of the printed patent, produced by omitting a space in the phrase "Mikš et al.")

Applicant respectfully disagrees. The following is a quotation from the MPEP setting forth the three basic criteria that must be met to establish a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP §2142, citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Atty. Docket No. 420228

Furthermore, a proposed modification cannot render the prior art unsatisfactory for its intended purpose:

If proposed modification would render the prior art unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. [MPEP 82143, citing *In re Gordon*, 733 F.2d 900,221 USPQ 1125 (Fed. Cir. 1984)]

Also, courts have held:

"The combination of elements from non-analogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a prima facie case of obviousness." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992).

At the outset, we point out that the statement of reasons for rejecting each of claims 18, 19 and 23-29 is difficult to follow and does not address the elements of each claim under rejection. The Examiner begins with "Regarding claims 18, 23, 25, 26, 27, 28, and 29..." Office Action, page 2. It is shown below that the reasons given are not equally applicable to all of the claims in this group, and that the rejection is therefore improperly expressed.

A plurality of claims should never be grouped together in a common rejection, unless that rejection is equally applicable to all claims in the group." MPEP §707.07(f), under "Improperly Expressed Rejections."

Moreover, the reasons given in the following paragraphs do not adequately explain what combinations the Examiner proposes. For example, the Examiner first appears to suggest that an "optical phase filter" of George is that required by claim 18, but later argues that "Mikset [sic] also teaches constants and functions of phase filter can be change [sic] to produce a desired effect" (Office Action, page 3) and even later asserts that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to us [sic] a cubic phase function ..." (Office Action, page 3). It is therefore not clear whether the Examiner is proposing a combination that utilizes George's phase filter, Mikš' phase filter or a phase filter with a cubic phase function. Similar issues arise in trying to interpret what kind of post-processing is suggested in the remarks pertaining to claims 23-29.

Therefore, we attempt to answer the Examiner's reasons for rejection as best understood, but we reserve the right to respond to a corrected or subsequent non-final Office Action if any of the assumptions we have had to make concerning the Examiner's reasons are incorrect.

Atty. Docket No. 420228

Claim 18 requires the following elements:

- (a) at least one optical phase filter including a phase mask; and
- (b) a controller for positioning the optical phase filter to alter phase of a wavefront of the imaging system to change at least a selected one of depth of field and aberration tolerance;
- (c) wherein the phase mask implements a cubic phase function
- (d) when moved by the controller.

We contend that claim 18 is patentable over George in view of Mikš because, at least, (1) any conceivable modification of George with Mikš would result in an apparatus that is unsuitable for its intended purpose, and (2) George, Mikš and information generally available in the art do not teach or suggest elements (c) or (d) of claim 18.

First, any conceivable modification of George by Mikš would result in an apparatus unsuitable for George's intended purpose. The phase functions taught by George appear to extend depth of field, which amounts to improving an image, as discussed above. The Examiner contends that Mikš teaches constants and functions for phase filters "to produce a desired effect," but such functions are clearly intended to distort or deform an image, and would thus, if used, defeat the intended purpose of George.

In another illustration of George being unsatisfactory for its intended purpose if modified by Mikš, George teaches use of circularly symmetric lenses as objects of the invention therein, but Mikš teaches only asymmetric surfaces. For example, "It is an object of the present invention to provide an improved system, method, and apparatus for capturing and processing images to provide an extended depth of field using a circularly symmetric multifocal aspheric lens." George, paragraph [0007], emphasis added. But, in contrast to George's explicit object, Mikš teaches "This distorting optical system 1 may be realized in numerous ways with optical elements using refraction, reflection and diffraction of light or a combination of the above elements. It may consist of one or more lenses of which at least one has at least one asymmetric aspherical optical surface. It may be also created by one or more diffractive elements, where at least one diffractive element has a surface with asymmetric diffractive structure." Mikš, col. 2, line 66 - col. 3, line 7, emphasis added. Therefore, utilizing the asymmetric surfaces of Mikš - if that is what the Examiner intends - defeats an explicit object of George's invention. Also,

Atty. Docket No. 420228

utilizing a cubic phase function, which is also an asymmetric surface - if, alternatively, that is what the Examiner intends - similarly defeats the same explicit object of George's invention.

Second, neither George, Mikš or the knowledge generally available to one of skill in the art teaches or suggests element (c) or (d) of claim 18, that is, "[c] wherein the phase mask implements a cubic phase function [d] when moved by the controller." The Examiner states "it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a cubic phase function, since PSF functions of the cubic phase can be simulated to manipulate the images in digital correction." Office Action, page 3. Respectfully, this observation is not only hindsight, but also fails because: (1) the cited art still does not teach or suggest all of the claim limitations, and (2) it follows Applicant's explicit traverse of the same argument from last Office Action, which traverse was not answered, and is therefore conceded by the Examiner.

Even if - and Applicant does not agree to this - it were obvious to use a cubic phase function, neither George, Mikš or the knowledge generally available to one of skill in the art teaches or suggests utilizing a phase mask that implements a cubic phase function when moved by a controller. For example, the Examiner correctly notes that "George fails to specifically disclose the optical phase filter is moveable/repositioned during imaging." Office Action, page 2. Since George does not disclose an optical phase filter being moveable, George does not disclose implementing a specific phase function when the phase filter (phase mask) is moved. Mikš also does not teach how any specific phase function can be created by moving a phase mask: "In this instance the optical element forming the distorting optical system 1 consists of rotationally asymmetric aspherical lens located before the photographic lens 7, so as the asymmetric lens is turned, in this case around the axis of the photographic lens 7, and thus various distortion of the shot object 4 in dependence on the angle of its rotation is created." Mikš, col. 4, lines 14-20. "... aspherical lenses 11 and 12 may rotate around the axis O-O'. The distorting effect is the strongest in the position shown in FIG. 5. In the position shown in FIG. 6 there is zero distorting effect and the system works as a normal photographic lens..." Mikš, col. 4, lines 25-29. This is not the same as teaching how to implement a phase function - let alone a cubic phase function - by moving a phase mask. The above-quoted passages of Mikš appear to be the only passages related to moving optical elements to do anything. Therefore we conclude that George and Mikš, alone or in combination, do not teach or suggest element (d) of claim 18.

Atty. Docket No. 420228

Furthermore, the argument that a cubic phase function would be "obvious to one of ordinary skill in the art" has already been directly traversed by Applicant, which traverse has not been answered by the Examiner.

"...the assertion 'It would have been further obvious to one of ordinary skill in the art ... to use a cubic phase form, since the image would be provided with a near constant transfer function.' can be made only in impermissible hindsight and is unsupported by documentary evidence as to what is obvious to one of ordinary skill in the art. We again request documentary evidence pursuant to MPEP 2144.03(C) to support this assertion, if the rejection of claim 18 is maintained." Amendment and Response filed 3 February 2006, page 14.

The Examiner is required to answer all material traversed. "Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it." MPEP 707.07(f), "Answer All Material Traversed." The Examiner is also required to "address any arguments presented by the applicant which are still relevant to any references being applied." MPEP 707.07(f), Examiner Note following form paragraph 7.38. The shift from the rationale that the Examiner previously alleged - "the image would be provided with a near constant transfer function" - to the new rationale "PSF functions of the cubic phase can be simulated to manipulate the images in digital correction" does not change the fact that Applicant specifically argued against use of a cubic phase function as "obvious to one of ordinary skill in the art," and that such traverse has not been answered. Therefore Applicant maintains that the Examiner has conceded that use of a cubic phase function is not obvious to one of ordinary skill in the art, and the Examiner is therefore barred from persisting in a rejection based on this premise.

However - and Applicant does not agree that the Examiner is allowed to do so - if the Examiner persists in maintaining that the use of a cubic phase function is "obvious to one of ordinary skill in the art," Applicant again requests documentary evidence pursuant to MPEP 2144.03(C) to support this assertion. "If applicant adequately traverses the examiner's assertion of official notice, the examiner must provide documentary evidence in the next Office action if the rejection is to be maintained." MPEP 2144.03(C).

Since (1) any combination of George and Mikš would result in an apparatus that is unsuitable for its intended purpose, and (2) George, Mikš and information generally available in

Atty. Docket No. 420228

the art do not teach or suggest elements (c) or (d) of claim 18, we request reconsideration and withdrawal of the rejection of claim 18 as unpatentable over George in view of Mikš.

Claim 19 depends from claim 18 and benefits from like arguments. Claim 19 also requires a phase function of the form $P(x,y) = \alpha x^3 + \beta y^3 + \delta x^2y + \gamma xy^2$, where $P(x,y)$ represents phase as a function of the spatial coordinates (x,y) . The Examiner states: "Regarding claim 19, as discussed above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the phase mask as a cubic phase function. The claimed formula would also be within the skill of ordinary skill [sic] in the art, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art." Office Action, page 3. However, the formula in claim 19 is not "an optimum value of a result effective variable." A formula is different from a variable; in fact, the formula actually defines result-effective variables, which definition is a nonobvious first step before such result-effective variables can be optimized. Since claim 19 depends from claim 18, argued above as patentable, and claim 19 further contains a nonobvious formula, we request reconsideration and withdrawal of the rejection of claim 19 as unpatentable over George in view of Mikš.

Claim 23 requires the following step elements:

- (a) positioning one or more optical phase filters in the optical system,
- (b) repositioning the optical phase filters to affect the imaging properties,
- (c) capturing images from the optical system, and
- (d) post-processing a digital representation of the images to reverse effects induced by the optical phase filters.

We contend that claim 23 is patentable over George in view of Mikš because, at least, (1) any modification of George by Mikš would result in an apparatus unsuitable for George's intended purpose, as also argued above with respect to claim 18, and (2) George, Mikš and information generally available in the art do not teach or suggest the combination of the elements of claim 23, and certainly not with any "reasonable expectation of success" as required under *In re Vaeck*.

George, Mikš and information generally available in the art do not teach or suggest the combination of elements in claim 23. For example, the Examiner alleges that George discloses element (a), "positioning" one or more optical phase filters: "(user inserts the filter in the lens

Atty. Docket No. 420228

system of the camera)." Office Action, page 2. But the Examiner admits that "George fails to specifically disclose the optical phase filter is moveable/repositioned during imaging [element (b)]," as noted above. Furthermore, George does not disclose element (d), "post-processing a digital representation of the images to reverse effects induced by the optical phase filters" in combination with elements (a) and (b). George only discloses that "Processing of the blurred image may be one of inverse filter, convolution matrix (e.g., edge sharpening matrix), or maximum entropy," (George, paragraph [0012]), and discusses these methods at paragraphs [0055] through [0068]. George does not disclose how post-processing would be adjusted to accommodate changes in imaging properties produced by repositioning optical phase filters, and thus fails to teach or suggest element (d) in combination with elements (a) and (b) of claim 23.

Mikš, also, does not teach or suggest element (d) of claim 23. The Examiner states, "In the same field of endeavor, Mikset [sic] discloses image blurring effects in the optical imaging system can be implemented using to [sic] optical lenses that rotate (move/reposition) to produce distorted images (see col. 3, lncs 1-15, col. 4, lines 1-35)." Office Action, page 2. Respectfully, this statement is not true and is not relevant to the requirements of claim 23. Mikš does not teach "blurring" (in fact the words "blur" and "blurring" are not found anywhere in Mikš) and blurring is not required by claim 23. The Examiner also states "Mikset [sic] also teaches constants and functions of phase filter can be change [sic] to produce a desired effect." Office Action, page 3. This also is not true; Mikš teaches that constants and functions of phase filter can be changed to produce certain desired distortions, but certainly does not teach or suggest how such constants and functions can be changed to produce any desired effect (if that is what the Examiner means). Mikš does not discuss post processing at all. In particular, Mikš and George do not teach how to post-process to reverse even the distortions produced by Mikš, let alone changes thereof caused by repositioning, nor how to post-process to reverse the effects of George's phase filter at any other position than a single position. (In fact, one skilled in the art will see that the methods suggested by George - inverse filters, convolution matrix, or maximum entropy filtering - will not act to remove distortion provided by Mikš' system.) There is no reasonable expectation of success for combining George with Mikš - the combination the Examiner proposes - to position one or more optical phase filters in an optical system, reposition the optical phase filters to affect the imaging properties, and post-process a digital representation of images to reverse effects induced by the optical phase filters.

Atty. Docket No. 420228

Nonetheless, the Examiner concludes "it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify George, as taught by Mikset [sic] to control the imaging effects and depth of field." Office Action, page 3. Again, we disagree; for the reasons discussed above, such a combination is not taught or suggested, and to the degree that elements thereof are suggested in piecemeal, there certainly is no "reasonable expectation of success" as required under *In re Vaeck*.

Because (1) any conceivable modification of George by Mikš would result in an apparatus unsuitable for George's intended purpose, and (2) George, Mikš and information generally available in the art do not teach or suggest the combination of the elements of claim 23 at all, and certainly not with any "reasonable expectation of success" as required under *In re Vaeck*, we contend that claim 23 is patentable over George in view of Mikš. We request reconsideration and withdrawal of the rejection of claim 23.

Claims 24 and 25 depend from claim 23 and benefits from like arguments. Furthermore, claim 25 requires a step element of "adjusting one or both of focus and aperture of the imaging system, the step of repositioning comprising repositioning the optical phase filters to counter imaging effects associated with the step of adjusting one or both of focus and aperture." The Office Action appears to direct no remarks or arguments to this step element, specifically, no remarks or arguments have been advanced relative to either of the step elements of "adjusting one or both of focus and aperture of the imaging system" and "repositioning the optical phase filters to counter imaging effects associated with the step of adjusting one or both of focus and aperture." Thus, the Examiner has failed to present a *prima facie* case of obviousness; therefore Applicant is under no obligation to submit evidence of nonobviousness. MPEP §2142. Absent a *prima facie* showing of obviousness, Applicant requests reconsideration and withdrawal of the rejection of claims 24 and 25.

Claim 26, as amended, requires the following step elements:

- (a) moving a phase filter within the optical system to modify phase of the wavefront; and
- (b) forming a final image by post processing data from a detector of the optical system to reverse effects induced by the phase filter and achieve the selected image properties.

Similar to our reasons with respect to claims 18 and 23, we contend that claim 26 is patentable over George in view of Mikš because, at least, (1) any conceivable modification of

Atty. Docket No. 420228

George by Mikš would result in an apparatus unsuitable for George's intended purpose, as also argued above, and (2) George, Mikš and information generally available in the art do not teach or suggest the combination of the elements of claim 26 at all, and certainly not with any "reasonable expectation of success" as required under *In re Vaeck*.

As is the case for claim 23, George, Mikš and information generally available in the art do not teach or suggest the combination of the elements of claim 26. For example, George does not disclose how post-processing would be adjusted to reverse effects induced by moving a phase filter, therefore George fails to teach or suggest the step elements of claim 26. Mikš does not discuss post processing at all. Even combined, Mikš and George do not teach how to post-process to reverse the distortions produced by Mikš, nor changes thereof caused by moving a phase filter, nor how to post-process to reverse the effects of George's phase filter at any other than a single position. There is no reasonable expectation of success for combining George with Mikš, as the Examiner proposes, to move a phase filter within an optical system to modify phase of the wavefront, and to form a final image by post processing data from a detector of an optical system to reverse effects induced by the phase filter and achieve selected image properties.

Because (1) any conceivable modification of George by Mikš would result in an apparatus unsuitable for George's intended purpose, and (2) George, Mikš and information generally available in the art do not teach or suggest the combination of the elements of claim 26 at all, and certainly not with any "reasonable expectation of success" as required under *In re Vaeck*, we contend that claim 26 is patentable over George in view of Mikš. We request reconsideration and withdrawal of the rejection of claim 26.

Claims 27 and 28 depend from claim 26 and benefits from like arguments. Furthermore, claim 27 requires a step element of "modifying one or both of a focal length and aperture of the optical system, the step of moving comprising the step of moving the phase filter to compensate for modification of the focal length and aperture such that image properties remain substantially unchanged." The Office Action appears to direct no remarks or arguments to this step element, specifically, no remarks or arguments have been advanced relative to either of the step element "moving the phase filter to compensate for modification of the focal length and aperture such that image properties remain substantially unchanged." Thus, the Examiner has not presented a *prima facie* case of obviousness; therefore Applicant is under no obligation to submit evidence

Atty. Docket No. 420228

of nonobviousness. MPEP §2142. Absent a *prima facie* showing of obviousness, Applicant requests reconsideration and withdrawal of the rejection of claims 27 and 28.

Claim 29, as amended, requires the following step elements:

(a) moving at least two phase filters within the optical system to modify phase of the wavefront; and

(b) forming a final image by post processing data from a detector of the optical system to reverse effects induced by the phase filters and achieve the selected image properties.

Similar to our reasons with respect to claims 18, 23 and 26, we contend that claim 29 is patentable over George in view of Mikš because, at least, (1) any conceivable modification of George by Mikš would result in an apparatus unsuitable for George's intended purpose, as also argued above, and (2) George, Mikš and information generally available in the art do not teach or suggest the combination of the elements of claim 26 at all, and certainly not with any "reasonable expectation of success" as required under *In re Vaeck*. In the discussion of claim 26, it was noted that there is no reasonable expectation of success for combining George with Mikš to move a phase filter within an optical system to modify phase of a wavefront, and to form a final image by post processing data from a detector of an optical system to reverse effects induced by the phase filter and achieve selected image properties. The use of two phase filters instead of only one phase filter does not alter this argument substantially. We accordingly request the reconsideration and withdrawal of the rejection of claim 29.

3. - 4. Allowable Subject Matter

We appreciate the allowance of claims 1, 3-8, 10-12, 14, 16, 17 and 21.

We note the indication of allowable subject matter includes the statement: "The prior art fails to teach the optical imaging system of claim 1, further comprising a user interface for selecting en [sic] a magnitude of at least one of the image properties and a controller, responsive to user selections at the interface, to direct the controller to position the optical phase filter and affect the magnitude as claimed." Office Action, page 4. Respectfully, we note that the above sentence: (1) refers to elements that had been in claim 1 before amendment, but are no longer part of claim 1; (2) recites only portions of what is currently in claim 1, rather than the entire

Atty. Docket No. 420228

claim; and (3) does not mention any of the features of claims 3-8, 10-12, 14, 16, 17 and 21 that patentably distinguish over the prior art, nor Applicant's arguments pertaining thereto.

We also point out that Office policy requires clarity as to whether an Examiner has, or has not, found an Applicant's arguments fully persuasive:

"If applicant's arguments are persuasive and upon reconsideration of the rejection, the examiner determines that the previous rejection should be withdrawn, the examiner must provide in the next Office communication the reasons why the previous rejection is withdrawn by referring specifically to the page(s) and line(s) of applicant's remarks which form the basis for withdrawing the rejection. It is not acceptable for the examiner to merely indicate that all of applicant's remarks form the basis for withdrawing the previous rejection." MPEP 707.07(f).

To clarify the record in this application, we submit that the Examiner has found each of Applicant's arguments with respect to the previous rejections of claims 1, 3-8, 10-12, 14, 16, 17 and 21 to be fully persuasive and has accordingly withdrawn all previous rejections thereof. The Examiner is invited to refute or support this statement.

Conclusion


In view of the above Amendments and Remarks, Applicants have addressed all issues raised in the Office Action dated 17 April 2006, and respectfully solicits a Notice of Allowance. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

Applicants believe no fees are currently due, however, if any fee is deemed necessary in connection with this Amendment and Response, please charge Deposit Account No. 12-0600.

Respectfully submitted,

LATHROP & GAGE L.C.

Date: 14 July 2006

By: 
Curtis A. Vock, Reg. No. 38,356
4845 Pearl East Circle, Suite 300
Boulder, Colorado 80301
Tel: (720) 931-3018
Fax: (720) 931-3001